UTAH TAX REVIEW COMMISSION

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September 4, 2009 DRAFT

Senator Wayne L. Niederhauser, Senate Chair
Representative Todd E. Kiser, House Chair
Revenue and Taxation Interim Committee
Utah State Capitol Complex
Salt Lake City, Utah

Gentlemen:

You asked the Utah Tax Review Commission (TRC) to respond to several questions regarding state excise taxes on cigarettes and other tobacco products. This letter contains our response to the questions you raised.

Introduction

Utah currently imposes an excise tax of 3.475 cents per cigarette that weighs three pounds or less per 1,000 (69.5 cents per pack of 20) and an excise tax of 4.075 cents per cigarette that weighs more than three pounds per 1,000. The state also imposes an excise tax of 75 cents per ounce on moist snuff and an excise tax of 35 percent of the manufacturer's price on all other tobacco products. The state first imposed an excise tax on cigarettes in 1923 and on other tobacco products in 1963.

For FY 2008, total cigarette and other tobacco product excise taxes generated about $62 million in revenue, comprised of cigarette excise tax collections of $54,388,888 and other tobacco products excise tax collections of $7,857,435.

What are the advantages and disadvantages of imposing an excise tax on cigarette and tobacco products in addition to the general sales tax?

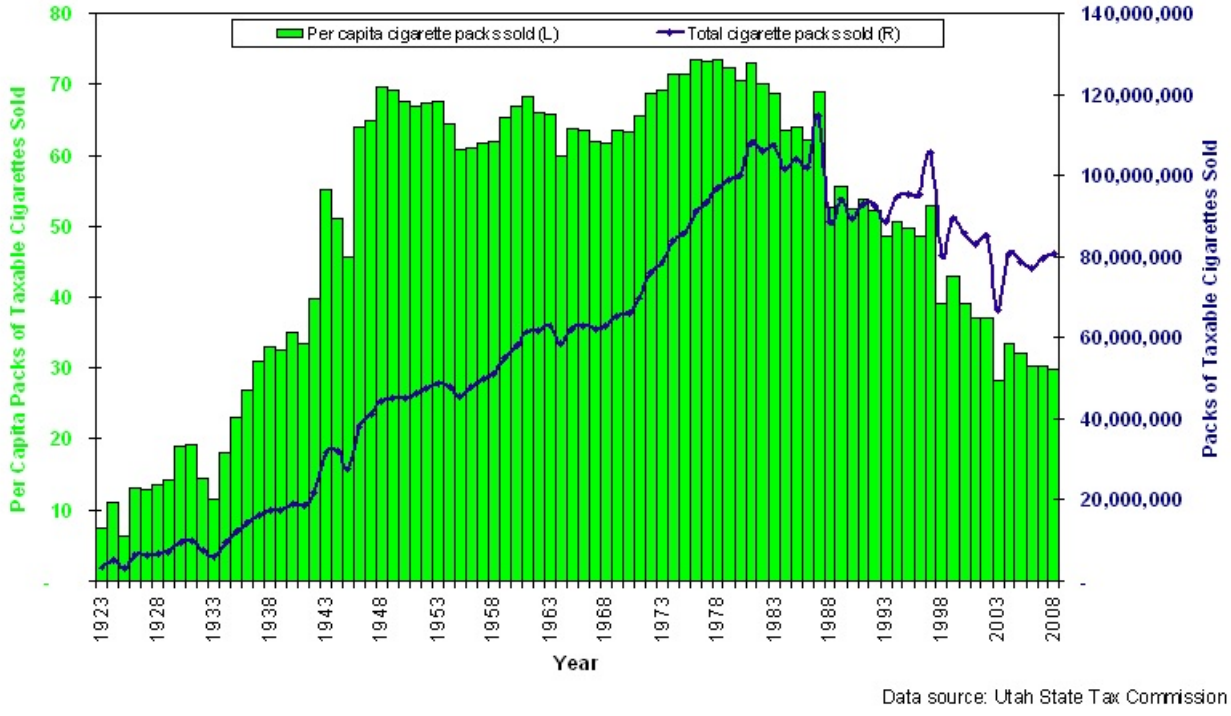
Advantages of imposing an excise tax on cigarettes and tobacco products include the following:

(1) excise taxes increase the price of the taxed items and higher prices generally discourage consumption, although higher prices may impact some individuals and groups more than others;
(2) tax revenue generated from the taxes can be used to pay for the societal costs associated with smoking, which may not be fully reflected in the market price; and
(3) these excise taxes provide a source of revenue to the state.

Disadvantages of imposing these excise taxes include the following:

(1) the cigarette excise tax is a regressive tax, especially "since consumption actually falls with increasing income" (Evans, Ringel, and Stech, p. 33);
(2) as with all taxes, cigarette and tobacco excise taxes paid result in a loss of disposable income that could be used for other purchases;
(3) the tax is levied on a relatively narrow base of taxpayers;
(4) the tax base is shrinking;
(5) the tax is imposed on a behavior that is addictive; and
(6) because this tax is an important source of state revenue, there is a potential conflict between the demand for revenue and the goal of reducing smoking.

Chart 1
Per Capita Cigarette Packs Sold and Total Cigarette Packs Sold
1923 to 2008



Data source: Utah State Tax Commission

What are the historical long-term trends for the cigarette and tobacco products tax base, tax rates, and tax revenues?

Tax Base

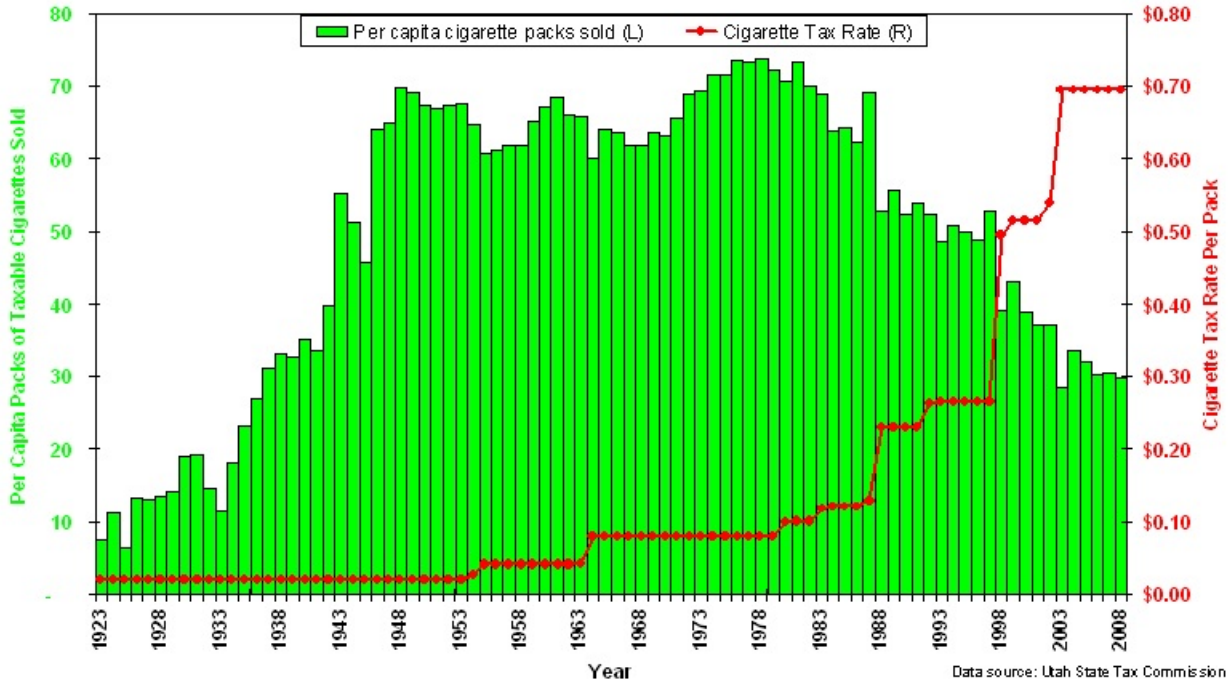
The tax base for the cigarette tax has been declining over the past several decades. Chart 1 above shows the per capita number of packs of cigarettes sold in Utah from 1923 to 2008. After climbing steadily from 1923 to about 1948, per capita consumption of cigarettes leveled off and slightly declined between 1949 and the late 1970s. Since then, per capita consumption has steadily declined from a high of just over 70 packs per capita in 1981 to under 30 packs per capita in 2008. Despite sizable total population increases, even total

consumption has declined from a high of 100-110 million packs in the late 1970s and early 1980s to about 80 million packs today.

Tax Rates

Chart 2 below displays the historical tax rate trend for the cigarette excise tax. The tax rate has been periodically increased over time, with the last increase from 51.5 cents per pack to 69.5 cents per pack in 2002. Although the chart does not include the tax rate for other tobacco products, this tax was originally imposed in 1963 at a rate of 25 percent and increased to 35 percent in 1986. We note that this percentage-based tax automatically adjusts with price changes over time.

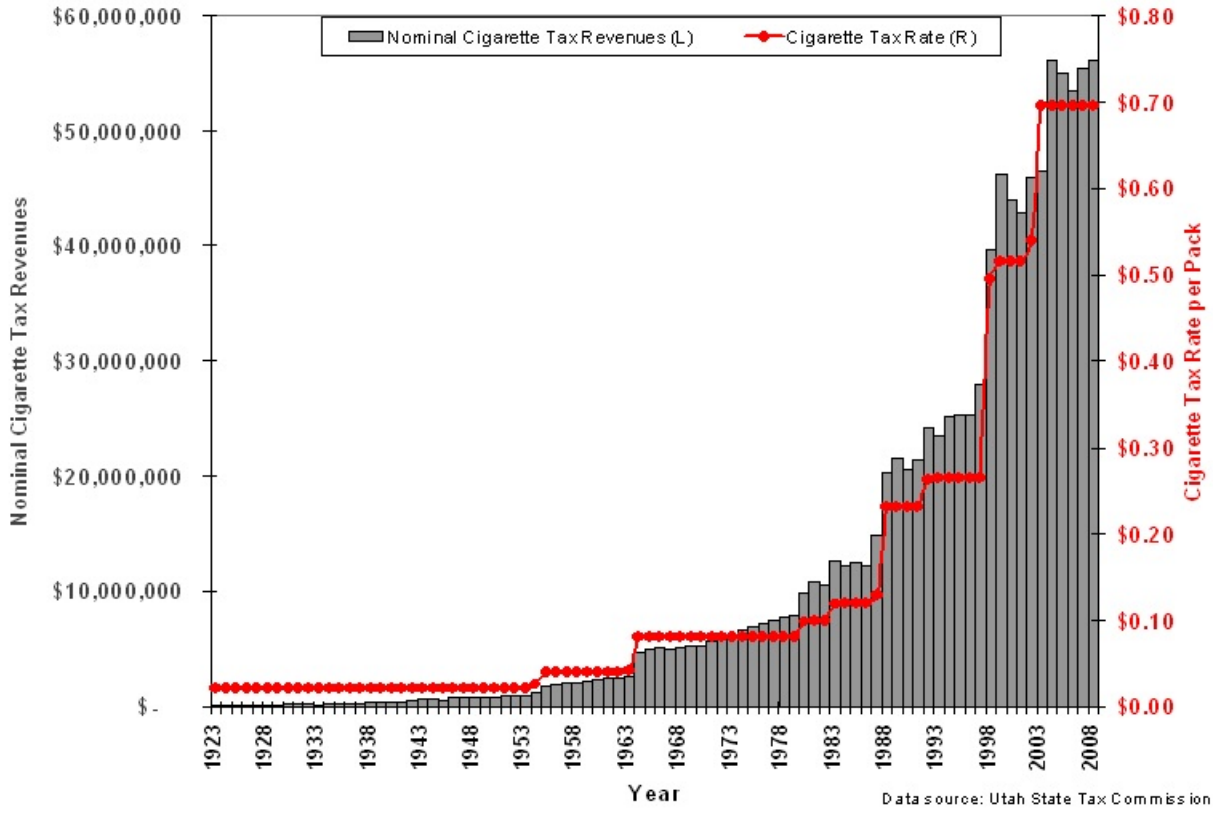
Chart 2
Per Capita Cigarette Packs Sold and Cigarette Tax Rate
1923 to 2008



Tax Revenues

Driven primarily by tax rate increases, cigarette excise tax revenue increased fairly steadily from 1923 to 2004, declined slightly in 2005 and 2006, and then rose again in 2007 and 2008. The revenue trend for the state cigarette excise tax is displayed in Chart 3 on the next page.

Chart 3
Nominal Cigarette Tax Revenues and Cigarette Tax Rate
1923 to 2008



Are cigarette and other tobacco product excise taxes likely to be a sufficient long-term revenue source?

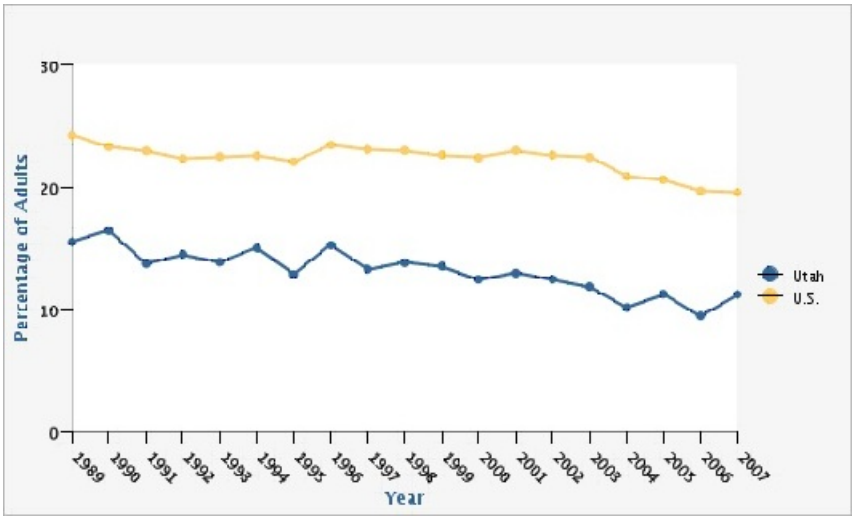
Although revenue sufficiency is a very important issue for the Legislature to consider in making tax policy, we believe determination of sufficiency is beyond the TRC's purview. However, in examining revenue sufficiency, a key question to consider is: sufficient for what? In other words, what is the Legislature's purpose in imposing excise taxes on cigarettes and other tobacco products? Is the purpose to offset societal costs associated with smoking and tobacco use? To discourage smoking and tobacco use? Or simply to raise revenue?

Another issue to consider relative to revenue sufficiency is the declining tax base. As noted in Chart 1 on page 2, both total and per capita sales of taxable cigarettes have declined since the late 1970s, with a greater decline in per-capita consumption. As shown in Chart 4 on page 5, survey data also demonstrates a declining prevalence of smoking in Utah, suggesting a continuing reduction in the tax base.

If the main purpose of the tax is to raise revenue, we note that the nominal amount of revenue generated by these taxes appears to be fairly steady in the periods between rate

increases. However, without regular and consistent tax rate increases, revenue from the cigarette excise tax is likely to become an ever-shrinking portion of total state tax revenue. This is because of the generally declining base and the fact that this tax is a per-unit tax rather than a percent-of-price tax. To the extent the Legislature desires a tax that automatically adjusts with price changes, one option would be to adjust the cigarette excise tax (and the tax on moist snuff) to a percentage rather than a nominal per-unit amount.

Chart 4
Percentage of Adults Who Report Smoking, US and Utah
1989 to 2007



Data Source: Utah Department of Health

If the purpose of the tax is to discourage smoking, the declining base could be considered as evidence that the tax is still yielding sufficient revenue to fund prevention programs while at the same time discouraging smoking through higher prices.

How would a tax increase be likely to impact consumer behavior, including actual cigarette and tobacco consumption and fugitive purchases?

Consumption
An enormous amount of economic literature exists on the extent to which smoking is correlated with price (inclusive of taxes). Researchers note that, "nearly every study finds smoking declines in the face of higher taxes and/or prices, but the results do vary across surveys." [1] Reduction in consumption comes from both the participation effect (smoking or not smoking) and the intensity effect (how much).

"Appendix A - Literature Review of Cigarette and Tobacco Price Elasticities" includes a sampling of the many studies conducted on the relationship between the price for cigarettes and other tobacco products and the demand for those products.

Chaloupka and Warner (1999) present a detailed review of the relevant literature through the date of their study, listing over 350 studies in their list of works cited. One section of their

study aggregates elasticity estimates from studies which use different types of aggregate- and individual-level data and use different models to estimate demand in response to price change. They conclude that, "the price elasticity estimates for overall cigarette demand from recent studies fall within the relatively wide range from -0.14 to -1.23, but most fall in the narrower range of -0.3 to -0.5." That is, most studies they reviewed suggest that a 10 percent price increase would be expected to result in a 3-5 percent consumption decrease.

In another study, Evans, Ringel, and Stech (1999) also found that the short-term price elasticity of demand is between -0.30 and -0.50, with long-term elasticities 1.75 times the short-term elasticities. This means that if the price for cigarettes increases by 10 percent, the demand for cigarettes will decrease between 3-5 percent in the short term and between about 5-9 percent in the long term. The authors note that half of the change in demand in their estimates is due to a reduction in the number of smokers.

A representative of the Governor's Office of Planning and Budget told the TRC that his office uses a price elasticity of demand for cigarettes of -0.40 (the midpoint of the studies referenced above) when analyzing the effects of a cigarette tax increase on cigarette consumption.

Using the -0.30 to -0.50 range of elasticities, Table 1 below estimates the percentage reduction and quantity reduction in packages of cigarettes sold in Utah. This table is based on the 2008 average price per pack of cigarettes of $4.03 and 80,686,695 packages of cigarettes sold.

Table 1
Estimated Reduction in Demand for Cigarettes
For Certain Increases in the State Cigarette Excise Tax

Excise Tax Rate Increase ($)	% Change in Price	Short-term Elasticity: -0.30		Short-term Elasticity: -0.50	
		% Change	# Packs Change	% Change	# Packs Change
0.50	12.41%	-3.72%	-3,003,227	-6.20%	-5,005,378
1.00	24.81%	-7.44%	-6,006,454	-12.41%	-10,010,756
1.50	37.22%	-11.17%	-9,009,681	-18.61%	-15,016,134
2.00	49.63%	-14.89%	-12,012,907	-24.81%	-20,021,512
Excise Tax Rate Increase ($)	**% Change in Price**	**Long-term Elasticity: -0.525**		**Long-term Elasticity: -0.875**	
		% Change	**# Packs Change**	**% Change**	**# Packs Change**
0.50	12.41%	-6.51%	-5,255,647	-10.86%	-8,759,412
1.00	24.81%	-13.03%	-10,511,294	-21.71%	-17,518,823
1.50	37.22%	-19.54%	-15,766,941	-32.57%	-26,278,235
2.00	49.63%	-26.05%	-21,022,588	-43.42%	-35,037,647

The evidence presented to the TRC suggests that higher prices on cigarettes and other tobacco products result in a change in quantity demanded for these products. However, we want to emphasize that we cannot precisely determine the extent or strength of the relationship between price and demand for cigarettes and other tobacco products.

We also note that factors other than price will cause a change in demand for cigarettes and tobacco products. These factors include individual taste, advertising, health warnings, and peer group attitudes. Although the academic literature has examined these issues, the estimates above and in Appendix A examine only changes in price and not changes in these other variables.

Evans, Ringel, and Stech (1999) also examined the effects of large tax increases in Arizona, Michigan, Massachusetts, and New York. The authors made two observations regarding changes in per capita consumption of cigarettes: "First, there is a noticeable drop in per capita consumption in states after a large tax change. Second, in all four states, consumption continues to fall relative to aggregate U.S. consumption for the first few years after the tax increase. These results suggest that the full effect of a tax change may take a few years to fully develop."

A review of Chart 1 on page 2 also suggests that prior to previous Utah tax rate increases, consumers may have accelerated their purchases of cigarettes and distributors may have accelerated their purchases of cigarette tax stamps in the months immediately preceding the tax rate increase. Should the Legislature decide to increase the cigarette excise tax in the future, these purchasing patterns may result in a one-time increase in revenue in the fiscal year preceding the fiscal year in which the tax rate increase takes effect.

Effects of price increases by age and income
Evidence suggests that different individuals and groups react differently to changes in price. For example, several studies suggest that adolescents and young adults are much more responsive to price than older adults.

Several recent studies also suggest that cigarettes are an inferior good. That is, the total amount of consumption (not just consumption as a percentage of income) actually decreases as income increases. This makes the tax regressive. However, to the extent that low-income households are more responsive to price increases, as some studies suggest, an increase in the tax may be less regressive than the distribution of the existing tax.

Fugitive Purchases
Utah borders two states with lower cigarette excise tax rates (Idaho 57¢,and Wyoming 60¢ per pack) and three states with higher cigarette excise tax rates (Nevada 80¢, Colorado 84¢, and Arizona $2.00 per pack). Given the relatively small difference in tax between Utah and the lower-tax states of Idaho and Wyoming, it is unlikely that large-scale operations for cross-border cigarette purchases exist in Utah. However, it is possible that smaller scale interstate purchases take place, especially in locales close to purchasing locations across the border. It is also important to note that distributors and retailers in other states may already capture

some of the interstate tax differential through price increases that more fully equalize the total price.

"Appendix B - Estimates of Casual Smuggling by State" includes a table from a recent National Tax Journal article that estimates the extent of interstate "casual smuggling" by state. This study estimates that about 4.4 percent of Utah cigarette consumers smuggle and that the net change in cigarette sales due to casual smuggling is -6.0 percent (Lovenheim)[2].

The TRC also received testimony from the Utah Food Industry Association (Association) that cross border sales do occur. The Association provided the results of a study that showed the effects of cross-border shopping in Iowa after that state increased its cigarette excise tax. After increasing its tax by $1.00 per pack, Iowa had a higher cigarette excise tax rate than four out of five of its neighboring states. The study states that "Iowa retailers saw sales plummet by 28% to 40% along the border with lower-tax Missouri while Missouri border retailers saw a corresponding increase sales surge of 49% to 115%."[3]

The Association told the TRC that, "many consumers make purchasing decisions based on the best price. The resulting price differentials [resulting from an increase in the Utah cigarette excise tax] between Utah and its neighbors will provide incentives for smokers to cross the border to buy cigarettes."[4] The Association also testified that fugitive purchases occur when Utah residents purchase cigarettes on Native American reservations that are not required to collect state taxes.

Federal law prohibits the imposition of state cigarette excise taxes on sales of cigarettes on military bases. Active duty and retired members of the armed forces are able to avoid state excise taxes and sales taxes by purchasing tobacco products on military bases.

Tribal excise taxes
Utah Code § 59-14-204.5 provides that "cigarettes sold to or received by members of a federally recognized Indian tribe that are purchased or received on tribal lands are not subject to the [excise tax]."

Because the U.S. Supreme Court has upheld the right of the states to require tribes to collect cigarette taxes on sales to non-Indians[5], Utah Code § 59-14-204.5 also provides that "the tax applicable to cigarettes sold to or received by non-tribal members on tribal lands is equal to the state tax imposed on Section 59-14-204, minus any tribal tax actually paid." That is, a non-tribal member purchasing cigarettes on tribal land is not required to pay both the full state excise tax and any excise tax imposed by the tribe.

According to the Utah State Tax Commission, cigarettes sold on tribal lands bear the excise tax stamp. Sales made to legal tribe members are reported to the state and a refund of the excise tax for those sales is issued to the vendor.

It is apparent that the purchase of cigarettes on tribal lands is not an effective method for non-tribal members to avoid the state cigarette excise tax, except in the case of a retail establishment that fails to adhere to state law.

To what extent would consumer behavior changes from a tax increase impact tax revenues, both for the cigarette and tobacco products tax and the general sales tax?

2009 General Session S.B.114 proposed increasing the state cigarette excise and tobacco product taxes. The tax rate increase, percentage tax rate increase, and estimated increases in tax revenue are displayed in Table 2.

Table 2
Cigarette Excise and Tobacco Products Taxes Rate Increases Proposed in 2009 General Session S.B. 114

Name of Tax	Current Tax Rate	Tax Rate Under S.B. 114	Increase in Tax Rate		Est imated Increase in Tax Revenue	
			Rate	Percent	$	Percent
Cigarette excise	$0.695 per pack	$2.00 per pack	$1.30 per pack	187		
Tobacco products (except moist snuff)	35% of the manu-facturer's sales price	88% of the manu-facturer's sales price	53 percentage points	151		
Moist snuff	$0.75 per ounce	$2.15 per ounce	$1.40 per ounce	187		

How are cigarette and tobacco products tax revenues currently utilized?

As required by Utah Code § 59-14-204, approximately $8 million of cigarette-tax revenues are earmarked as follows:

- $250,000 to the Department of Health for a tobacco prevention media campaign;
- Approximately $3 million to Department of Health for prevention, reduction, cessation, and control programs (22 percent of 2002 rate increase);
- Approximately $2 million to University of Utah Health Sciences Center for Huntsman Cancer Institute cancer research (15 percent of 2002 rate increase);
- Approximately $3 million to University of Utah Health Sciences Center for University of Utah School of Medicine medical education (21 percent of 2002 rate increase).

All remaining cigarette tax revenues and all tobacco tax revenues are deposited into the General Fund (approximately $54 million).

In addition to tax revenue, Utah also receives funds related to the settlement agreement entered into with leading tobacco manufacturers on November 23, 1998. State law provides that 40 percent of these funds are deposited into the Permanent State Trust Fund and 60 percent are deposited into the Tobacco Settlement Restricted Account and then distributed as follows:

- $10,452,900 to the Department of Health for the Children's Health Insurance Program created in Section 26-40-103 and for restoration of dental benefits in the Children's Health Insurance Program;
- $3,847,100 to the Department of Health for alcohol, tobacco, and other drug prevention, reduction, cessation, and control programs;
- $193,700 to the Administrative Office of the Courts and $1,471,700 to the Department of Human Services for the drug court program;
- $77,400 to the Board of Pardons, $81,700 to the Department of Corrections, and $175,500 to the Department of Human Services for a drug board pilot program;
- $4,000,000 to the State Board of Regents for the University of Utah Health Sciences Center to benefit the health and well-being of Utah citizens through in-state research, treatment, and educational activities; and
- any remaining funds as directed by the Legislature through appropriation.

Should some of the revenues be set aside for research, prevention, and treatment of smoking-related diseases?

This question directly concerns how tax revenue should be spent and is not within the purview of the TRC. The Legislature should make this expenditure decision. However, we note that if the Legislature decides to increase funding for prevention, such funding may reduce consumption and in turn the revenue generated by this tax.

This issue returns to the question previously posed as to the purpose of these excise taxes. Is the purpose to offset societal costs associated with smoking and tobacco use? To discourage smoking and tobacco use? Or simply to raise revenue?

What would be the advantages and disadvantages of placing some or all of new cigarette and tobacco tax revenues into the state's Permanent State Trust Fund, with only investment earnings deposited into the General Fund?

While we also view this as a question regarding spending and therefore best left to the Legislature to decide, we offer the following observations about placing some or all of new revenue into a trust fund:

- revenue from trust funds is best used for long-term purposes;
- depositing new revenue into a trust fund assumes that the primary purpose of imposing these taxes is to raise revenue;
- any new funding that the Legislature desires for prevention and treatment would have to come from other sources, including trust fund earnings; and

- trust fund earnings could be earmarked for prevention and treatment programs.

Advantages include:

- ensuring a stable, long-term source of revenue for prevention and treatment programs if the trust fund earnings are earmarked for such purposes;
- promoting spending discipline by making any new revenue unavailable in the short term;
- recognizing that the base for these taxes is declining and ensures an ongoing source of revenue after the base has eroded; and
- reducing the incentive to support a rate increase since there is no immediate increase in revenue; tax rates are likely to be lower than they would without a trust fund.

Disadvantages include:

- little or no immediate increased funding would be available to pay for the cost borne by the state for the treatment of smoking-related illnesses; and
- limits the revenue currently available to policy makers to fund existing budget needs.

Conclusion

We hope that this information is helpful to you and other members of the Legislature as you make decisions regarding cigarette and tobacco taxes.

Endnotes

1. Evans, William N., Ringel, Jeanne S., and Stech, Diana "Tobacco Taxes and Public Policy to Discourage Smoking" *Tax Policy and the Economy*. Volume 13. edited by James M. Poterba. 1999.

2. Lovenheim, Michael. "How Far to the Border?: The Extent and Impact of Cross-Border Casual Cigarette Smuggling." National Tax Journal Vol. LXI, No. 1 (2008).

3. "Cross-border Purchasing Impacts Retailers and Government Revenues." Document submitted to the Utah Tax Review Commission by Jim Olsen, President, Utah Food Industry Association. May 1, 2009.

4. Utah Food Industry Association. May 1, 2009.

5. LaFaive, Michael, Fleenor, Patrick, and Nesbit, Tod. “Cigarette Taxes and Smuggling.” Mackinac Center for Public Policy, 2008.

APPENDIX A
Literature Review of Cigarette and Tobacco Price Elasticities

Authors	Title	Year	Elasticity estimate	Notes
Baltagi, Badi H., and Dan Levin	Estimating Dynamic Demand for Cigarettes Using Panel Data: The Effects of Bootlegging, Taxation, and Advertising	1986	-0.22	
Becker, Gary S., Michael Grossman, and Kevin M. Murphy	An Empirical Analysis of Cigarette Addiction	1994	Short run -0.36 to -0.44 Long run -0.73 to -0.79	
Chaloupka, Frank J	Rational Addictive Behavior and Cigarette Smoking	1991	-0.27 to -0.48	
Chaloupka, Frank J and Kenneth E. Warner	The Economics of Smoking	1999	-0.30 to -0.50	Literature review
Coats, Morris R.	A Note on Estimating Cross-Border Effects of State Cigarette Taxes	1995	-0.167 to -0.806	
Emery, Sherry, Martha M. White, and John P. Pierce	Does Cigarette Price Influence Adolescent Experimentation?	2001	-0.83 to -2.24	Youth cigarettes
Evans, William N, Jeanne S. Ringel, and Diana Stech	Tobacco Taxes and Public Policy to Discourage Smoking	1999	-0.29 to -0.42	
Evans, William N., and Jeanne S. Ringel	Can Higher Cigarette Taxes Improve Birth Outcomes?	1997	-0.23 to -0.33	Pregnant women
Evans, William N., and Lynn Huang	The Impact of Cigarette Taxes on Youth Smoking: Evidence from Panels of Repeated Cross-sections	1998	-0.51	High school seniors
Farrelly, Matthew C, Jeremy W. Bray	Response to Increases in Cigarette Prices by Race/Ethnicity, Income and Age Groups	1998	-0.25	
Farrelly, Matthew C, Jeremy W. Bray, Terry Pechacek, and Trevor Woolery	Response by Adults to Increases in Cigarette Prices by Sociodemographic Characteristics	2001	Short run -0.28 Age 18-24 -0.55 Age 25-39 -0.53 Age 40+ 0.00 to -0.08	
Goolsbee, Austan, Michael Lovenheim, and Joel Slemrod	Playing with Fire: Cigarettes, Taxes, and Competition from the Internet	2007	-0.67 to -1.32	
Gruber, Jonathan, and Botond Koszegi	A Theory of Government Regulation of Addictive Bads: Optimal Tax Levels and Tax Incidence for Cigarette Excise	2002	-0.66	
Gruber, Jonathan, Anindya Sen, and Mark Stabile	Estimating Price Elasticities When There is Smuggling: The Sensitivity of Smoking to Price in Canada	2003	-0.45 to -0.47	
Keeler, Theodore E., The-wei Hu, W. G. Manning, and Hai-Yen	State Tobacco Taxation, Education, and Smoking: Controlling for Effects of Omitted Variables	2001	-0.22 to -0.29	
Lewit, Eugene and Douglas Coate	The Potential for Using Excise Taxes to Reduce Smoking	1982	Adult -0.45	
Lovenheim, Michael F	How Far to the Border? The Extent and Impact of Cross-Border Casual Cigarette Smuggling	2008	-0.10 to -0.53	
Mullahy, J	Cigarette Smoking, Habits, Health Concerns, and Heterogenous Unobservables in a Microeconomic Analysis of	1985	-0.47	
Ringel, Jeanna S, Jeffrey Wasserman, and Tatiana	Effects of Public Policy on Adolescents' Cigar Use: Evidence From the National Youth Tobacco Survey	2005	-0.34	Youth cigars
Stehr, Mark	Cigarette Tax Avoidance and Evasion	2005	Total -0.69 Avoidance -0.58	
Taurus, John A.	An Empirical Analysis of Adult Cigarette Demand	2005	-0.541 to -1.092	
Teh-Wei Hu, Qui-Fang Ren, Theodore E. Keeler, Joan	The Demand for Cigarettes in California and Behavioral Risk Factors	1995	-0.46	
Wasserman, Jeffrey, Willard G. Manning, Joseph P. Newhouse,	The Effects of Excises Taxes and Regulations on Cigarette Smoking	1991	-0.23	
Yurekli, Ayda A, and Ping Zhang	The Impact of Clean Indoor-Air Laws and Cigarette Smuggling on Demand for Cigarettes: An Empirical Model	2000	-0.62	

APPENDIX B
Estimates of Casual Smuggling by State

TABLE 8
PRICE ELASTICITIES, SMOKING INCREASES, PERCENT SMUGGLING, AND SALES EFFECTS BY STATE

Home State	Home State Price Elasticity	Full Price Elasticity	Percent Increase in Smoking Due to Smuggling	Percent of Consumers Who Smuggle	Percent Change in Net Sales Due to Smuggling
Alabama	–0.071	–0.457	2.52	18.66	–7.44
Arkansas	–0.034	–0.457	3.51	24.85	–16.04
Arizona	–0.427	–0.457	0.79	6.53	5.71
California	–0.455	–0.457	0.01	0.01	0.36
Colorado	–0.414	–0.457	0.45	3.93	–1.37
Connecticut	–0.186	–0.457	2.06	12.68	42.47
Washington, D.C.	1.398	–0.457	41.8	63.48	–63.48
Delaware	–0.457	–0.457	0.00	0.00	52.32
Florida	–0.357	–0.457	1.66	6.49	–4.34
Georgia	–0.367	–0.457	0.79	11.54	10.68
Iowa	–0.283	–0.457	0.88	7.26	49.7
Idaho	–0.457	–0.457	0.00	0.00	8.76
Illinois	0.210	–0.457	6.09	16.31	–15.83
Indiana	–0.240	–0.457	2.17	16.03	53.79
Kansas	0.271	–0.457	3.92	21.21	–24.91
Kentucky	–0.457	–0.457	0.00	0.00	61.33
Louisiana	–0.358	–0.457	0.05	2.54	1.88
Massachusetts	0.329	–0.457	15.45	36.66	–20.24
Maryland	0.402	–0.457	12.73	35.65	–29.18
Maine	0.068	–0.457	7.70	17.02	–17.02
Michigan	–0.223	–0.457	6.94	8.62	–5.95
Minnesota	–0.149	–0.457	2.50	11.35	–11.33
Missouri	–0.457	–0.457	0.00	0.00	35.55
Mississippi	–0.22	–0.457	0.40	9.12	55.17
North Carolina	–0.332	–0.457	0.23	5.55	6.71
North Dakota	–0.355	–0.457	0.68	3.38	–2.53
Nebraska	0.171	–0.457	0.86	19.38	–21.09
New Hampshire	–0.457	–0.457	0.00	0.00	104.21
New Jersey	0.377	–0.457	10.57	31.03	–6.53
New Mexico	–0.457	–0.457	0.00	0.00	10.86
Nevada	–0.341	–0.457	1.09	2.67	–4.60
New York	0.308	–0.457	6.45	19.62	–16.88
Ohio	–0.166	–0.457	1.81	13.02	–3.63
Oklahoma	–0.439	–0.457	0.06	0.70	10.44
Oregon	–0.453	–0.457	0.08	0.47	2.51
Pennsylvania	0.041	–0.457	2.44	13.07	0.44
Rhode Island	0.456	–0.457	4.85	34.85	–20.39
South Carolina	–0.111	–0.457	1.08	14.46	–6.15
South Dakota	–0.244	–0.457	0.49	7.71	–5.48
Tennessee	–0.022	–0.457	5.03	20.41	–6.62
Texas	–0.335	–0.457	1.62	5.69	–3.69
Utah	–0.27	–0.457	1.80	4.42	–6.01
Virginia	–0.244	–0.457	1.40	8.46	65.54
Vermont	–0.317	–0.457	1.24	4.55	18.10
Washington	–0.277	–0.457	7.93	11.84	–5.62
Wisconsin	–0.214	–0.457	0.89	8.63	1.98
West Virginia	0.108	–0.457	1.95	26.15	35.16

Note: All estimates are for years in which a state is not the lowest–priced state. The estimates represent the average across all MSAs within a state, not state–level averages, weighted by the number of observations that constitute each state–MSA observation.
Source: Elasticity estimates come from the author's calculation of equations [7] and [8] in the text using parameter estimates from Panel C, column iv of Table 6. Smoking increases are calculated from equation [9] in the text and smuggling percentages from equation [10] in the text using the parameter estimates from Panel C, column iv in Table 6 as well.

Lovenheim, Michael. How Far to the Border?: The Extent and Impact of Cross-Border Casual Cigarette Smuggling. National Tax Journal Vol. LXI, No. 1 (2008).